portion, its volume and weight will be increased twenty-seven times; and so on. Thus it is apparent that the weight increases in a vastly more rapid proportion than the strength, and that, consequently, in such increase of dimensions, a limit would speedily be attained at which the weight would become equal to the strength, and beyond this limit the structure would be crushed under its own weight. On the other hand, the more beyond this limit the dimensions of the structure are kept, the greater will be the proportion by which the strength will exceed the weight.

The strength on the large scale not to be judged by that of the model.—The strength of a structure of any kind is therefore not to be determined by its model, which will always be much stronger relatively to its size. All works, natural and artificial, have limits of magnitude which, while their materials remain the same, cannot be exceeded. Small animals are stronger in proportion than larger ones. We find insects and animalculæ capable of bodily activity, exceeding almost in an infinite degree the agility and muscular exertion manifested by the larger class: the young plant has more available strength in proportion than the forest tree.

An admirable instance of beneficence in the consequences of this principle is, that children, who are so much more exposed to accidents, are less liable to injury from them than grown persons."

The Patent Journal and Inventors' Magazine. Vol. X. Charles Johns, Chancery-lane.

WE are glad to see that this useful journal is progressing, and that it still sustains its character. To inventors and to all interested in new inventions it must be valuable for reference as well as for news. One of its latest novelties relates to the patent-specification and special claims of Mr. Paine, the American electrician, only recently published, the report having been delayed at the particular request of the assignee of the patent in England. In his specification the patentee states that "although water has been spoken of as decomposed by the electric currents, he wishes it to be understood that it is merely to accord with the generally received doctrines and phraseology, and that water, after all, may be a simple element." He claims—

"Firstly,—the use of helices, in which are hollow helical coils, to be filled at pleasure either with water or other electrical absorbent. Secondly, the use and construction of the electrodes, as described. Thirdly, the *mode of applying* electricity to the decomposition of fluids by pulsations or intermittent discharges. Fourthly, the construction and use of governors for regulating the electric current, as described. Fifthly, the method of catalizing or rendering hydrogen gas luminiferous, by passing it through spirits of turpentine, or other hydrocarbon at ordinary temperatures. Sixthly, the use of non-conducting pipes and isolated gasometers, for the purpose of conveying and holding the gases for the purposes of this invention."

Miscellanea.

ASSESSING WATER COMPANY'S WORKS TO LAND-TAX.—In the case of *Chelsea Water Works* v. *Bowley*, the Court of Queen's Bench has decided that the company are not liable to be assessed to the land-tax. Lord Campbell said they would have had no difficulty in coming to that conclusion, but for the decisions which had been come to by the Court, that these and similar companies were liable to be assessed to the poor-rate in respect of the land which they occupied. The 4th section of the 38th George III. chap. 5, enacted that all bodies having or holding any land or hereditaments should be liable to be assessed to the land-tax; and the question was, whether the Chelsea Water Works Company, in the enjoyment of the right conferred upon them by the 8th and 9th sections of the 8th George I., chap. 26, of laying down their pipes, could be said to have or hold any land or hereditaments within the meaning of the Land Tax Act, so as to be liable to be assessed to that tax. The right which the company enjoyed was rather in the nature of an easement than the occupation of land or a hereditament. It consisted in the right to convey water through the land of another; and whether the water was conveyed over the surface, or in covered drains, or in pipes, did not signify. The right was not assessible, nor were the pipes. The Land-Tax Act contemplated property which could be let to a tenant, and the 17th section of the Act provided that, though the tenant should pay the tax in the first instance, the amount might be deducted by him out of his rent. The company, however, were not the owners of the land where the pipes passed, and there was no rent out of which, if they were tenants, the amount of the tax might be deducted. The cases of the Bath, Brighton, and Chelsea Waterworks Companies touching the relief of the poor, had been much relied upon, for they were closely in point; but the Court, without overruling those cases, or saying whether or not they had been rightly decided, were of opinion that the word "land" had a different meaning in the statute of Elizabeth from what it bore in the Land-Tax Act.

THE DECIMAL SYSTEM OF MEASURES, &c.—In the last number of your journal, I see allusion made to the system of decimal coinage, weights, and measures, as used in France. In addition to the arguments there used for its adoption, might be added the facility for calculations,—a matter of no small importance to architects and surveyors. The complication of measures, for building works, adds in no small degree to the difficulty of making estimates, &c., in which we have to calculate the price of a foot of brickwork at so much per rod: this, in some parts of the country, is done in a different way, to add to the difficulty: then there is to reduce cube yards into feet; though, perhaps, the greatest trouble of all consists in the troublesome reduction of feet and inches, from its frequency and almost universality: in fact, there is not a decimal in the whole list. The proposition for adopting the decimal system is sensible, especially as from the present time we shall have more communication with foreigners, and it will, in all respects, be desirable in such cases to adopt a convenient standard.—A. J. B.

ENGLISH TENDERS FOR IRISH WORKS.—We have received a statement and complaint made by various respectable Irish ironfounders, to the effect that, although they had tendered for a new bridge of malleable iron to carry the line of the Dublin and Kingstown railway across the river Dodder, and although the plan accompanying the tender of one of the parties was identical with that of an English firm ultimately adopted, while the tender was for a considerably lower sum, with offer of sufficient security for its due execution, one and all of the Irish tenders were rejected; and that this is no mere isolated case, but one of a system by which gross injustice is done to Irish enterprise, and in which the prosperity of every member of the Irish community is more or less directly concerned.

TOWN-COUNCIL PROCEEDINGS.—The surveyorship of the city of Londonderry, with a salary of 150*l.* a year, having been declared, prematurely it would now appear, vacant, advertisements for a new surveyor were issued, and nineteen applicants appeared. The advertisement was published in Belfast and Dublin, as well as Londonderry, and consequently the greater number of the applicants were not Londonderrians. They no sooner responded to the call, however, than they were told that none but a citizen of Londonderry would be elected. The majority, therefore, returned to their respective homes, and five candidates remained, whom Mr. Newlands, the borough engineer of Liverpool, was engaged to examine. The report of Mr. Newlands stated that two of them might do for clerk of works, but these were the *elite* of the lot so far as regarded fitness for a surveyorship, abstractly speaking. The report was publicly read at a council meeting, and a discussion followed thereupon, when it was resolved "to advertise again in Derry, Dublin, and Belfast for a person to fill the office of town surveyor," and that "persons from a distance might rely on receiving the favourable consideration of the council, should their professional qualifications entitle them." A letter was then read from Mr. S. Gordon, urging that he had been appointed city surveyor as well as surveyor for the county, and that as he could not be removed without the sanction of his Excellency the Lord Lieutenant, and as that sanction had neither been sought nor obtained, he conceived that he was still the city surveyor, and that any new election whatever, under the circumstances, would be void and null. Mr. Gordon, it was stated, did not seek compensation: in fact, some of his labours had been taken off by the appointment of a town surveyor without any reduction of *his* salary; but he anticipated such a reduction by the grand jury, and therefore offered to pay 100*l.* to an overseer of works, and still to retain the city surveyorship in his own hands.

RAILWAYS *versus* ROADS.—When we consider the almost total diversion of traffic from off the turnpike-roads of this country, arising from the introduction of railway transit, it is a matter of some surprise, where the capability and power of the locomotive are so well known, that the trustees and others interested locally in the annual repair of such roads, never have, in any single instance, attempted to compete with the great monopoly. The idea has been suggested by several scientific gentlemen, showing the practicability of the scheme, at a very light comparative cost in construction. I, myself, think the project is well worthy of the attention of those more immediately interested. The question of cost may have been an objection, but there are many advantages which would tend materially to promote the enterprise. For instance, there would be no purchase of land, or law or parliamentary charges, added to cheap materials and labour. I am, from my experience, persuaded that the practicability of such is that it only requires an impetus by some influential party to show the necessity of similar modes of travelling. It is well known that, from our present lines of railway, many important towns are wholly destitute of that accommodation which the railway companies assured the public they would afford them: by the introduction of the wooden railway with a light rail and reduced gauge, they would ultimately prove an advantage to the existing lines in drawing the traffic from our lateral towns and villages to their principal stations. The suggestion for such mode of transit is of sufficient importance in itself to engage the attention of those gentlemen locally bound to improve the revenues arising from the various turnpike-roads of this kingdom. No class of men would benefit more than the farmers of this country, who, by adopting the railway at their own door, would reduce their horse-power very considerably.—ALPHA.

YORKSHIRE UNION OF MECHANICS' INSTITUTES.—The fourteenth annual congress of delegates from these associated institutes was held at Leeds on Wednesday in last week, when between seventy and eighty delegates assembled, for the purpose of comparing their experience, so as to enable them to know what are the best means of conducting such institutions, and making them conducive to the welfare of the community. The condition of the institutes this year, as compared with the last, is said to be very gratifying. The following is the state of those institutes whose reports give the means of comparing their condition in 1850 and 1851:—Comparison made with returns from 83 institutes, in 1850,—males, 12,442, females, 991; 1851, males, 13,173, females, 1,054, increase, 794, 6·8 per cent. In 79 institutes the annual income was in 1850, 6,855*l.*; in 1851, 7,426*l.*; increase, 571*l.*; 8·3 per cent. Comparison of 70 institutes for books in the libraries in 1850, 63,294; in 1851, 70,589; increase, 7,295; 11·5 per cent. Comparison of the circulation in 70 institutes, in 1850, 289,271; in 1851, 320,467; increase, 31,196; 10·7 per cent. In 77 institutes—comparison of totals of lectures paid and unpaid, in 1850, 620; in 1851, 715; increase, 85; 9·4 per cent. In 47 institutes, of which the total income was 2,737*l.*, the portion of incomes contributed by those who derived no advantage was 520*l.*, or 19 per cent.

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